Senegal Dairy Genetics / Sénégal Génétique Laitière

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The importance of dairy

Food security

- milk = high-quality food which supplies protein, energy & essential micronutrients
- consumption of even small amounts of milk can significantly increase nutritional security

Livelihoods

- cattle keeping / dairy is an important livelihood activity to rural households in Senegal

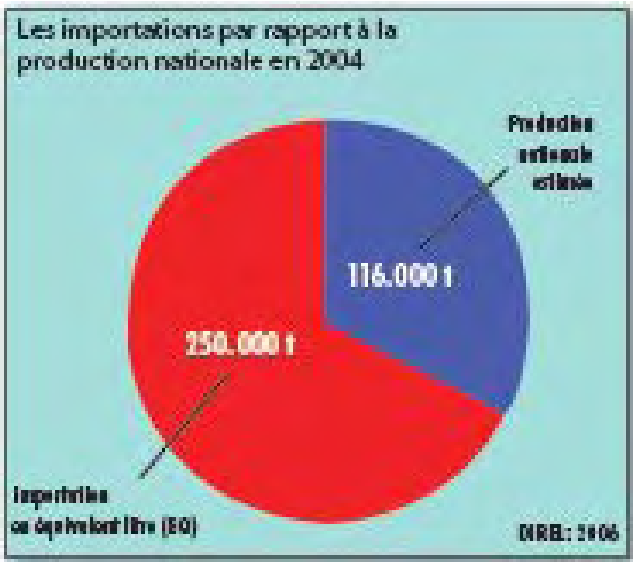
Dairy in Senegal

Senegal is a net importer of dairy products

The government is supporting dairy production including through the use of genetically improved animals

- public AI campaign
- local semen production center

– but no evidence base on the most appropriate type of dairy animal



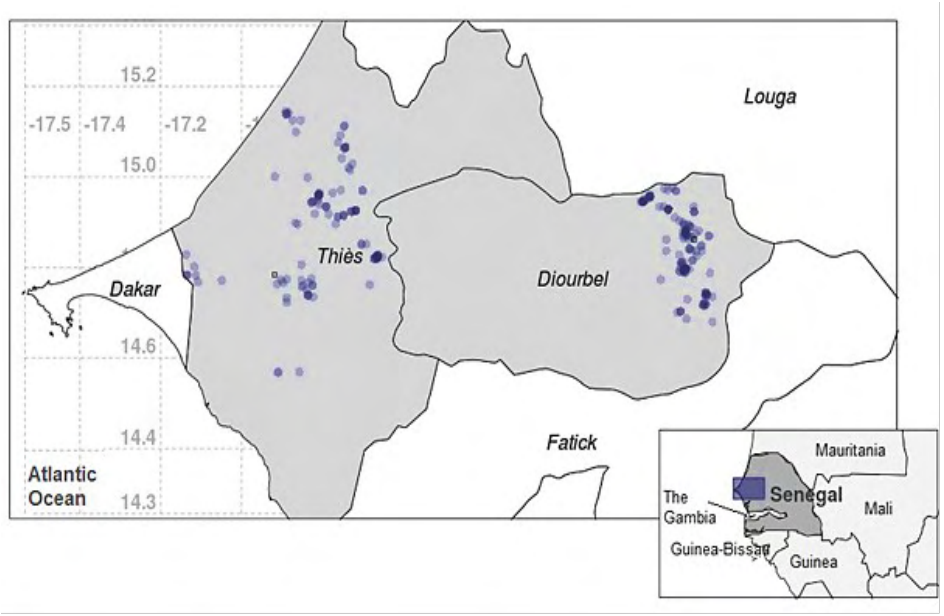
Imports relative to domestic production, 2004

From: Atlas de l'élevage au Sénégal

Work package objectives

To identify and promote utilisation of the most appropriate dairy breed-types for more productive and profitable dairy enterprises in selected production systems in Senegal

Key methodology: Longitudinal field survey on dairy



220+ households with ~3500 dairy animals in two sites, monitored over 2 year period

Collect socio-economic data (gendered) + animal-level data

All data in customised database internet accessible

Breed of animals determined using a DNA based approach

Key result – Dairy breeds defined

- Herds comprised a variety of different cattle breed-types

Indigenous Zebu

Indigenous Zebu by Guzerat

Indigenous Zebu by Bos Taurus

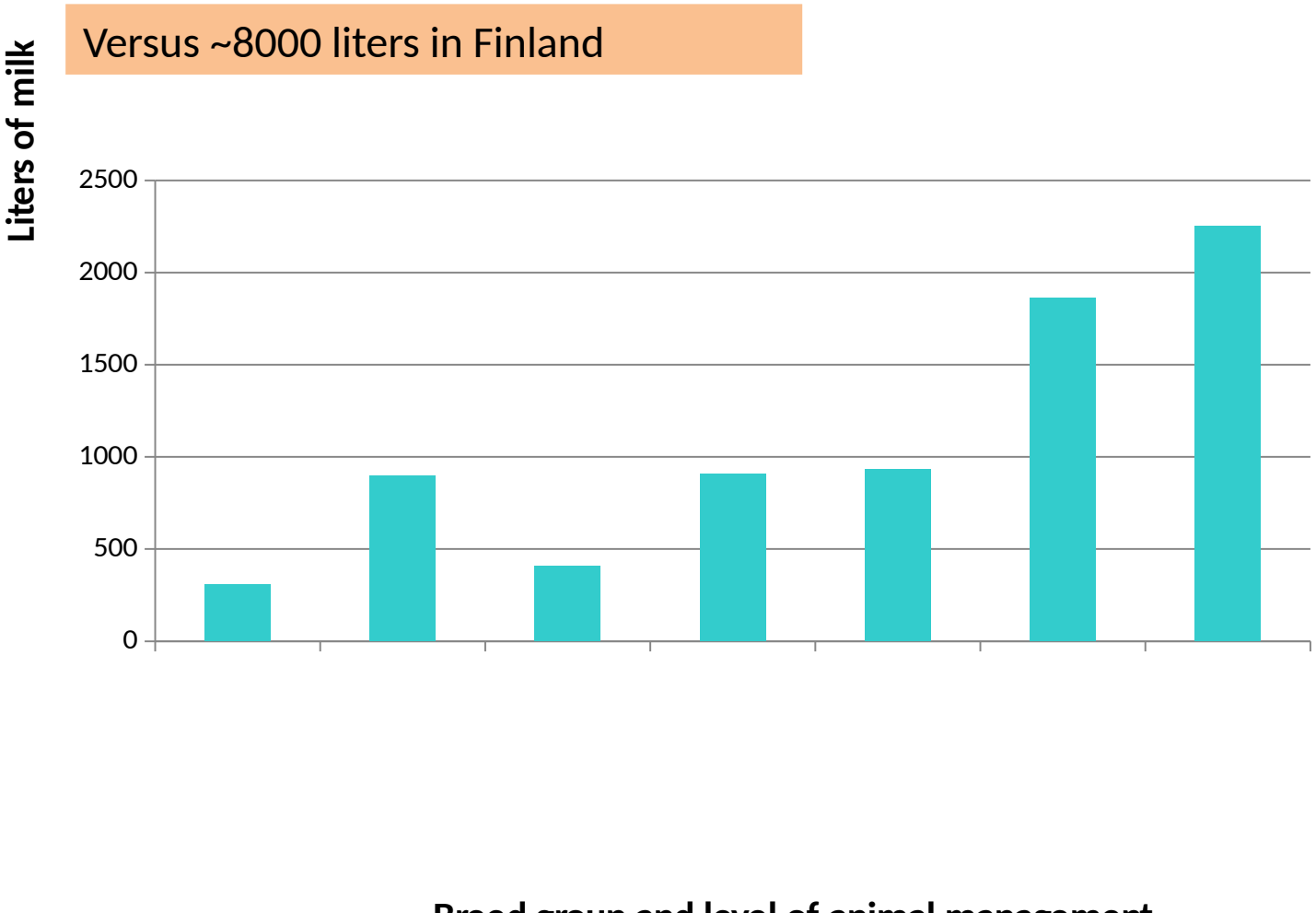
High Bos Taurus

Key result – Management practices understood

- Households applied different levels of management practices

Key result – Milk yields determined

Versus ~8000 liters in Finland



Lactation milk off-take per cow, in liters, for a 365 day lactation

Key result – model & parameter estimates to determine household profit of keeping different breeds

Model tailored to developing country dairy systems

> 40 parameters estimated from the collected data

Revenue

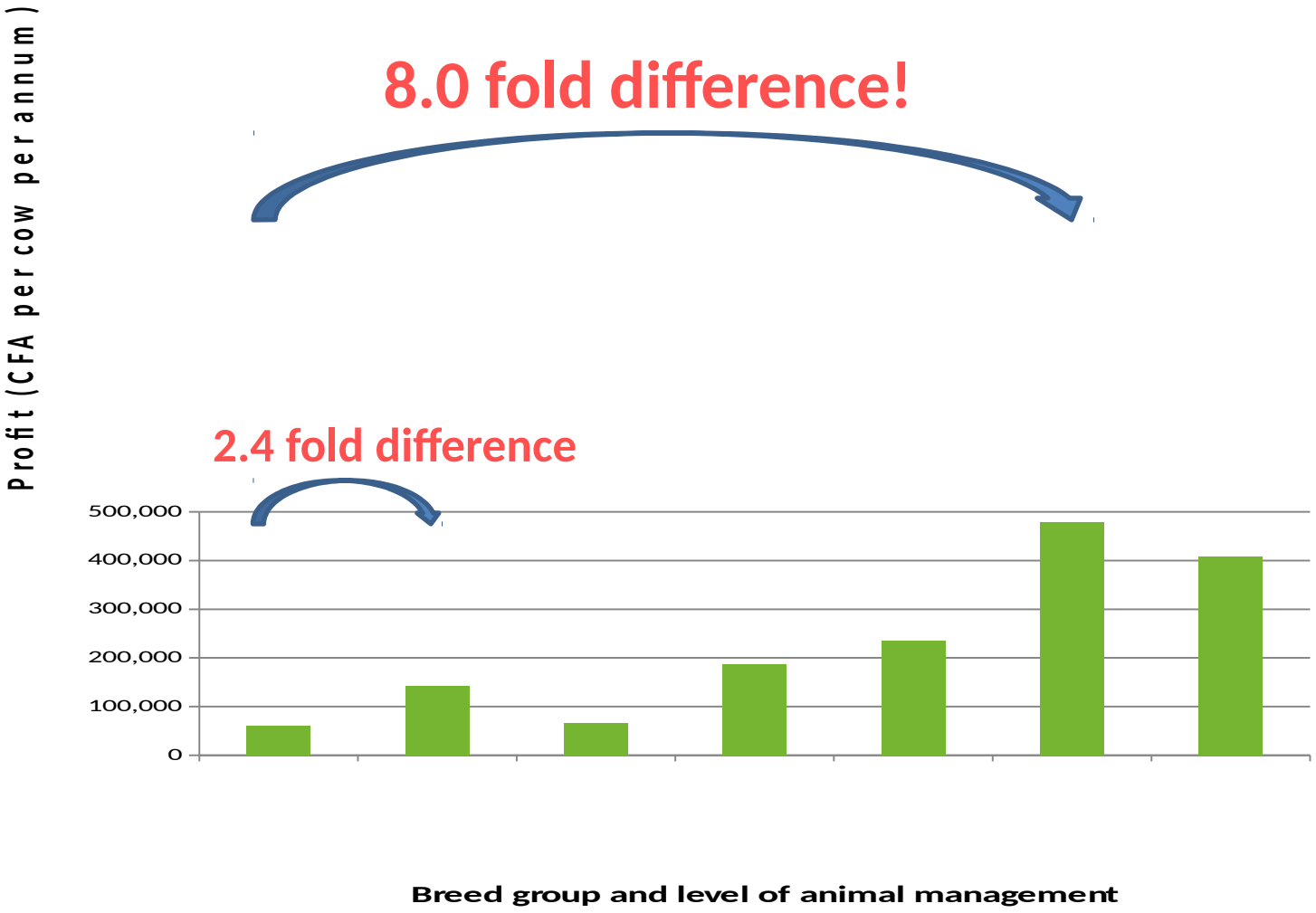
- *Milk: sold or consumed, and suckled by calves*
- *Male animal sale: calves, young, mature*
- *Female animal sale: young, and cull for age cows*

Costs

- *Feed*
- *Milk suckled by calves*
- *Health-care*
- *Animal-housing*
- *Labour*
- *Female reproduction*
- *Water*
- *Marketing and transport*

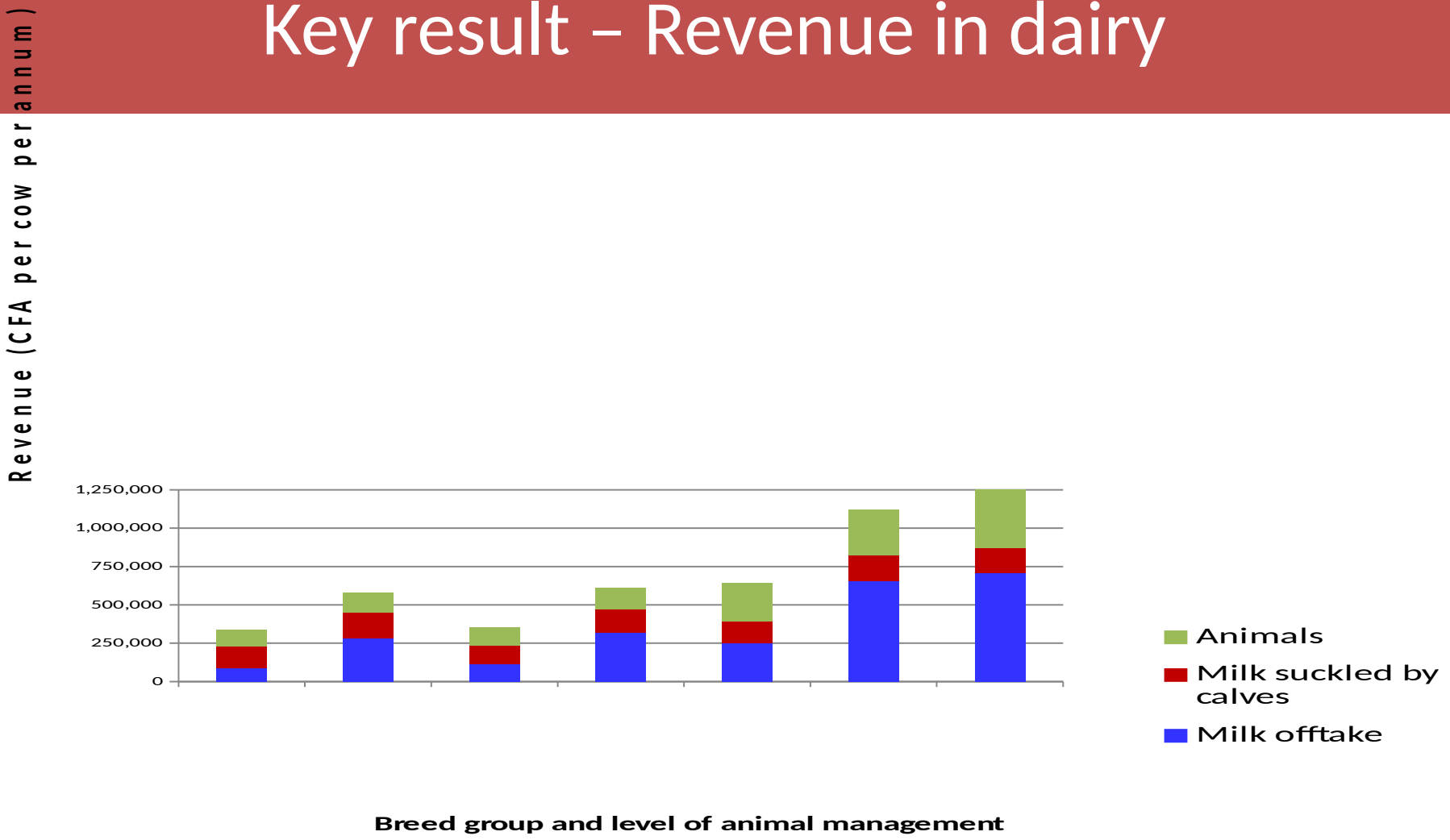
Profit per cow per annum
Cost:benefit per cow per annum

Key result – Household income from keeping different breeds determined



Herd size of 8 cows; non-transhumant; public AI

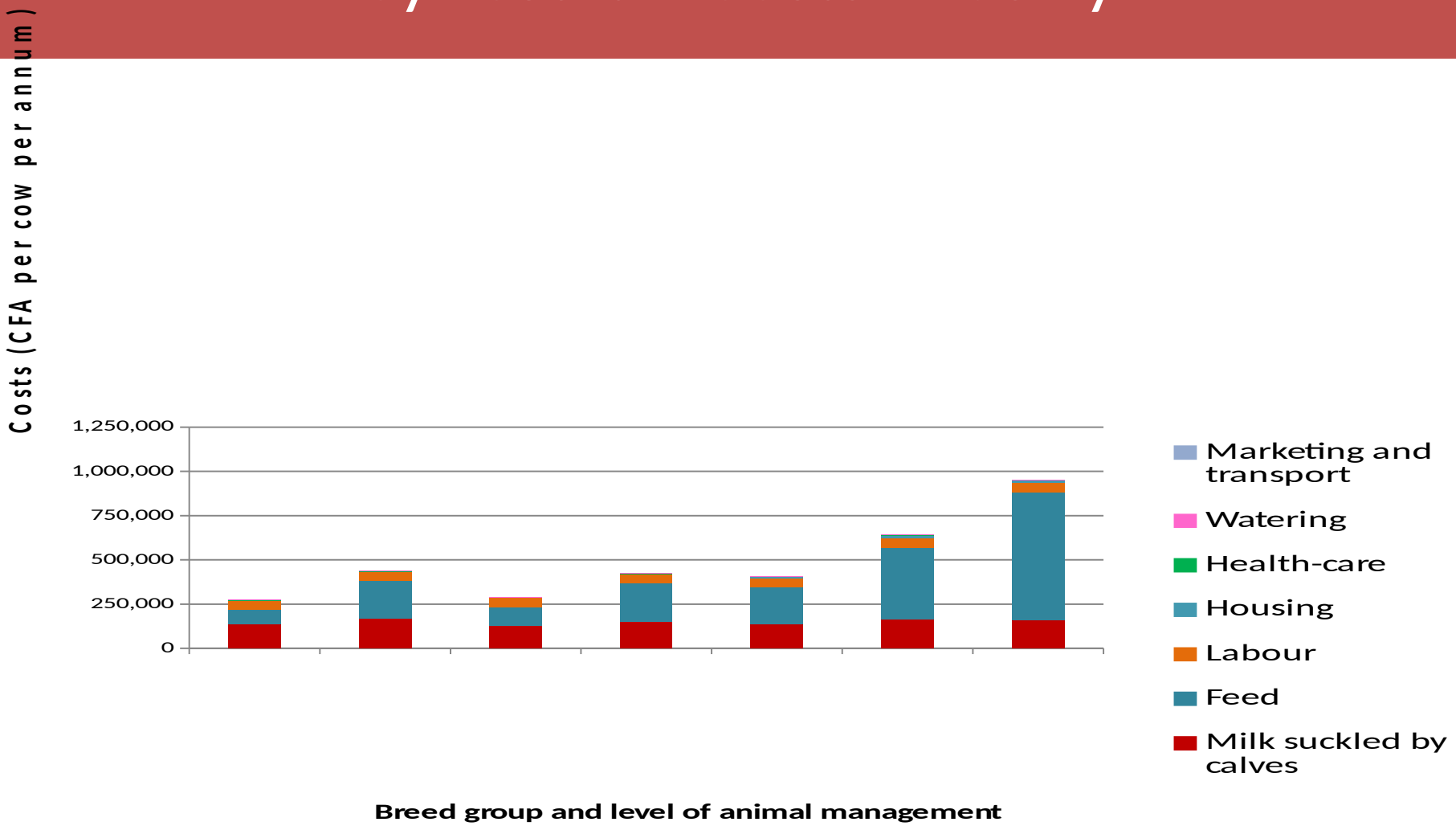
Key result – Revenue in dairy



Main benefit is from milk–

milk (suckled by calves & offtake) account for 61% - 77% of revenue

Key result – Costs in dairy



Main cost is feed –

milk suckled by calves & feed account for 80% - 92% of total costs

Key result – Livelihoods can be improved through combining good genetics with good animal management practices

Adapted
Productive
Profitable

Investment cost (housing, feed)

Access issues

Farmer capacity

Indigenous Zebu by Bos Taurus crossbred animals under good management.

Key result – IPGs

Methodological approach & survey tools

- Can be replicated

Model

- Fills a tool gap

Database

- Data available for use by other researchers

					1=yes, 0=no		1=yes, 0=no
Assumed scale of operation (4 or 12 cows)	Number of cows	8		Free bull (born to own herd, gifted etc.)	1	Purchased bull	0
				Breeds			
		AA		BC		DH	
Output prices	Unit	Poorer	Better	Poorer	Better	Poorer	Better
Milk sale price	Per litre	500	500	500	500	500	500
Male calf sale price	CFA per animal	160,500	160,500	160,500	160,500	212,000	212,000
Young male sale price	CFA per animal	176,000	176,000	205,500	205,500	536,000	536,000
Mature male sale price	CFA per animal	261,500	261,500	385,500	385,500	434,000	434,000
Female calf sale price (actually not used as model assumes no female	CFA per animal	161,000	161,000	161,000	161,000	212,000	212,000
Young female sale price	CFA per animal	251,000	251,000	262,500	262,500	551,500	551,500
Cull for age female sale price	CFA per animal	216,500	216,500	251,000	251,000	625,000	625,000
Costs							
Female calf health-care cost	CFA per calf per annum	120	244	198	287	444	459
Male calf health-care cost	CFA per calf per annum	56	114	92	134	207	214
Young male health-care cost	CFA per young per annum	52	105	86	124	192	199
Young female health-care cost	CFA per young per annum	106	215	175	253	392	405
Mature male health-care cost	CFA per mature male per ann	28	56	46	66	103	106
Cow health-care cost	CFA per cow per annum	210	425	345	500	775	800
Labour cost	CFA per herd per annum	420,000	420,000	420,000	420,000	420,000	420,000
Marketing and transport cost for milk sale	CFA per litre	0	0	0	0	0	0
Marketing and transport costs for animal sale	CFA per animal	0	0	0	0	0	0

Key result – Gender

Intra-household / gendered information on:

- Decision making
- Labour
- Payment of costs
- Control of benefits

Labour division

Gender	Who	Weekly labour hours	Main activities
Male	Household adult	30	Herding / animal care / milking
	Hired adult	55	
	Household boy	21	
Female	Household adult	7	Processing & sale of milk
	Hired female	7	
	Household girl	2	

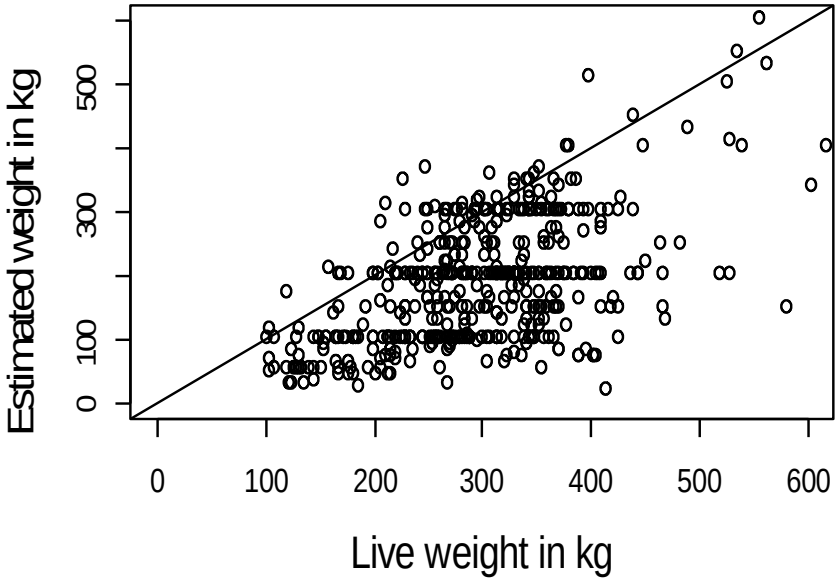
Key result – Gender

Control of income from the sale of milk can shift from women to men as market orientation increases

Level of market orientation	Control of income from the sale of milk		
	% Women	% Men	% Joint
Low	72%	27%	1%
Medium	45%	50%	5%

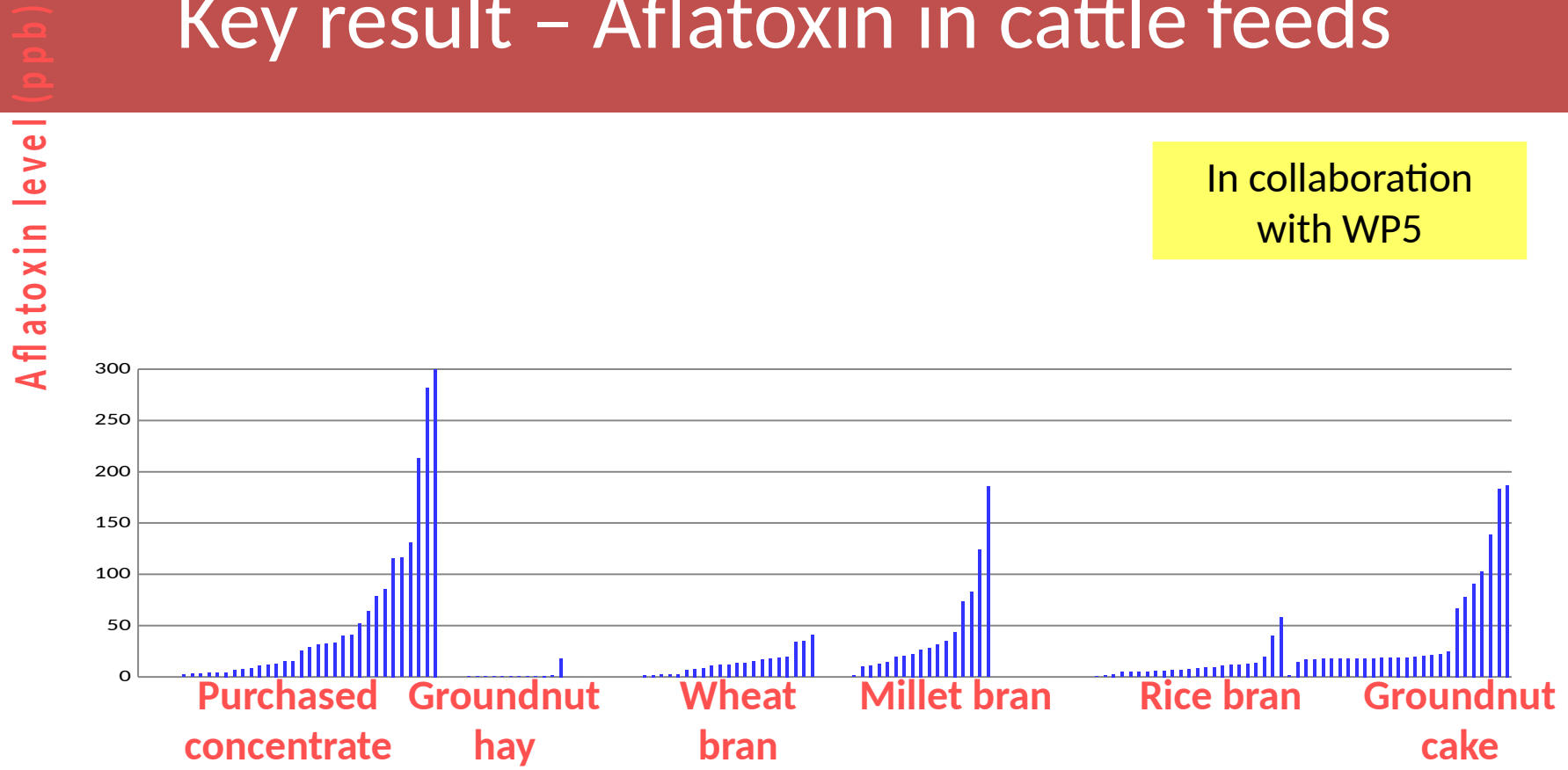
Follow-on projects may need to address this e.g. by gender transformative approaches

Key result – Prediction of cow body weight



Key result – Aflatoxin in cattle feeds

In collaboration with WP5



Many samples above WHO limit of 5ppb – but levels unlikely to affect animal productivity or milk safety

Key result – Dairy germplasm policy and value chain assessed

Supporting policy exists, but not always well implemented

Dairy germplasm value chain growth potential exists, should some limitation be addressed

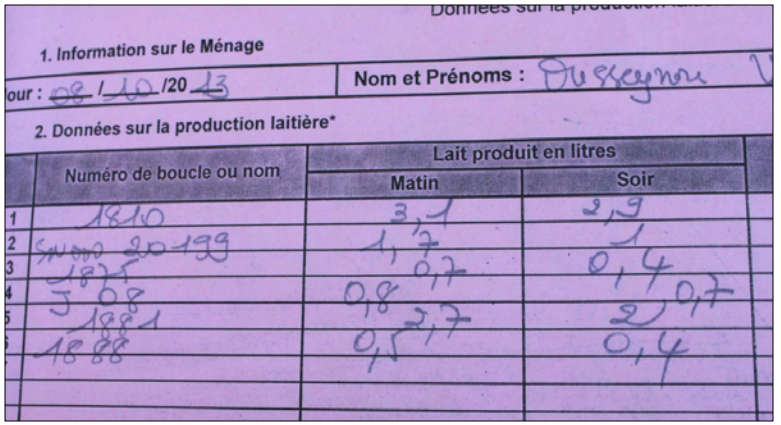
- Weak demand for private AI
- Low success of public AI

Various recommendations drawn – for further discussion with stakeholders

Rare twin calves born to AI

Key result – Farmers capacity built

Farmers trained on measuring milk and use of recording sheets

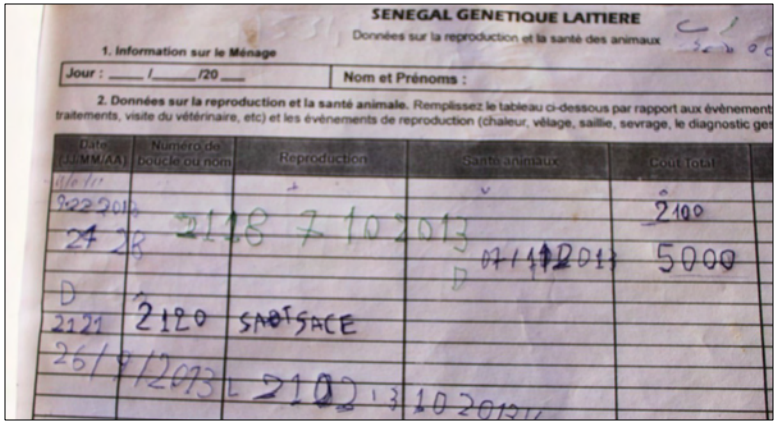


1. Information sur le Ménage

Nom et Prénoms :

2. Données sur la production laitière*

	Numéro de boucle ou nom	Lait produit en litres	
		Matin	Soir
1	1810	3,1	2,9
2	SN000 20199	1,7	1
3	1875	0,7	0,4
4	J 08	0,8	0,7
5	1881	2,7	2
6	1888	0,5	0,4



SENEGAL GENETIQUE LAITIERE

Données sur la reproduction et la santé des animaux

1. Information sur le Ménage

Jour : ____ /____ /20 ___ Nom et Prénoms :

2. Données sur la reproduction et la santé animale. Remplissez le tableau ci-dessous par rapport aux évènement traitements, visite du vétérinaire, etc) et les évènements de reproduction (chaleur, vêlage, saillie, sevrage, le diagnostic ge

Date (JJ/MM/AA)	Numéro de boucle ou nom	Reproduction	Santé animaux	Cout Total
27 28	2118	7 10 2013		2100
				5000
2121	2120	SNOTSACE		
26/9/2013		2102	3 10 2013	

Key result – Farmers capacity built

Training topic	Number sessions	Number female farmers	Number male farmers
1. Domestic biogas, with Heifer International Senegal	**9**	**146**	**366**
2. Fodder preservation – treatment of hay with urea	**8**	**145**	**258**
3. Fodder conservation – grass collection & storage 4. Improving AI success rates	**8**	**126**	**245**
5. Milk yields of different cattle breeds; own animal milk yields 6. Use of weigh bands	**8**	**103**	**220**
7. Household profit of keeping the different cattle breed-types	Planed late April		

Key result – Farmers capacity built

Key result – Farmers capacity built

Farmers received information on milk yields of the different breeds as well as their own animals

Projet Sénégal Génétique Laitière

Rapport sur la production laitière

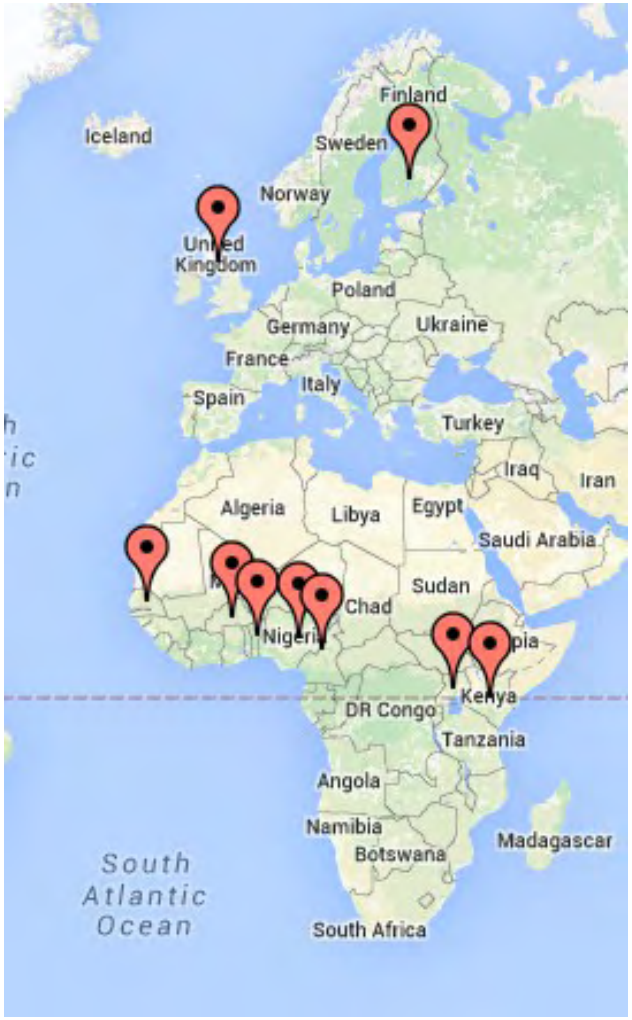
Nom	SALIOU BANE
N° du ménage	HH004
Village /région (site)	Thies/Tivaouane

Lait produit par jour et par an pour une vache en lactation selon le type de race

Type Race		Lait produit par jour		Lait produit par an	
		Mauvaise gestion	Bonne gestion	Mauvaise gestion	Bonne gestion
	**Race Locale :** - Zébu Gobra, - Zébu Maure, - Djakoré	0,9 L	2,1 L	275 L	651 L
	**Guzerat (Métisse):** - Guzerat & Zébu Maure - Guzerat & Zébu Gobra, - Guzerat & Djakoré	1,1 L	2,6 L	344 L	787 L

N° Vache	Race	Lait produit par jour (L)	Lait produit par an (L)
P1122	Métisse	5	1525
P1124	Métisse	5	1579
P0097	Race Locale	2	610

Key result – Researcher capacity built



10 higher degree students received training through the project

4 PhD students
5 Masters
1 Thesis component DVM

8 students were African nationals!

Next steps

Dissemination & capacity building:

Extension material developed and delivered to farmers and other stakeholders by a variety of means

Implementation phase:

access to cross-bred semen;

access to credit;

strengthened policy and value chain governance;

public-private partnerships;

access to inputs and markets

Technology adoption

ANCAR S.A
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Our donors

FoodAfrica

CGIAR RESEARCH PROGRAM ON Livestock and Fish

Our project farmers

The research team

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UNIVERSITY OF HELSINKI

Our field staff